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CHANNEL IN NEWARK BAY NORTH OF SHOOTERS
ISLAND, NEW YORK AND NEW JERSEY.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF
EXAMINATION AND SURVEY OF CHANNEL IN NEWARK BAY,
NEW JERSEY.

JANUARY 3, 1907.—Referred to the Committee on Rivers and Harbors and
ordered to be printed, with accompanying illustration.

WAR DEPARTMENT,
Washington, December 24, 1906.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated 22d instant, together with copies of reports from Col. W. R. Livermore and Col. D. W. Lockwood, Corps of Engineers, dated January 26, 1906, and December 6, 1906, with map, of a preliminary examination and survey, respectively, of a channel in Newark Bay, New Jersey, from the Kill van Kull north of Shooters Island to the existing channel near Corner Stake light, including the reef at Bergen Point light, made by them in compliance with the provisions of the river and harbor act of March 3, 1905.

Very respectfully,

WM. H. TAFT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 22, 1906.

SIR: I have the honor to submit herewith, for transmission to Congress, reports of January 26, 1906, and December 6, 1906, with map, by Col. W. R. Livermore and Col. D. W. Lockwood, of the Corps of Engineers, on preliminary examination and survey, respectively,

authorized by the river and harbor act approved March 3, 1905, of a channel in Newark Bay, New Jersey, from the Kill van Kull north of Shooters Island to the existing channel near Corner Stake light, including the reef at Bergen Point light, with a view to obtaining a depth of 16 feet.

The cost of the proposed improvement is estimated at \$280,115, with \$5,000 annually for maintenance after completion. For the facts and reasons given I concur in the opinion of the local officer and the Board of Engineers for Rivers and Harbors that the locality in question is worthy of improvement by the United States as an extension of the existing project for work on Arthur Kill, or Staten Island Sound, from Kill van Kull to Raritan Bay.

Very respectfully,

A. MACKENZIE,

Brig. Gen., Chief of Engineers, U. S. Army.

The SECRETARY OF WAR.

PRELIMINARY EXAMINATION OF CHANNEL IN NEWARK BAY, NEW JERSEY,
FROM KILL VAN KULL NORTH OF SHOOTERS ISLAND.

UNITED STATES ENGINEER OFFICE,
New York, N. Y., January 26, 1906.

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GENERAL: I have the honor to submit the following report upon a preliminary examination of a channel from the Kill van Kull north of Shooters Island to the existing channel near to Corner Stake light, including the reef at Bergen Point light, with a view to obtaining a depth of 16 feet, made in compliance with Department letters dated March 16 and April 6, 1905, and pursuant to the requirements of the river and harbor act approved March 3, 1905.

The waterway of which this channel would be a branch consists of the Arthur Kill for about 12 miles, the lower end of Newark Bay for about 2 miles, and the Kill van Kull for about 3 miles, all together forming the continuous inland waterway between upper New York Harbor and Raritan Bay.

Prior to the adoption of the present project, sections of this waterway have been under improvement by the United States under the titles of "Channel between Staten Island and New Jersey, New York and New Jersey," and "Arthur Kill, New York and New Jersey." Detailed descriptions of these projects are printed in the Annual Report of the Chief of Engineers for 1900, pages 178 and 1525 to 1530. The present project was adopted by the river and harbor act approved June 13, 1902, and it provides for a channel from Kill van Kull to Raritan Bay, New York and New Jersey, 300 feet wide and 21 feet deep at mean low water, at an estimated cost of \$696,000, and \$5,000 for annual cost of maintenance, in accordance with report submitted in House Document No. 393, Fifty-sixth Congress, first session. This act provided—

That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the project recommended in said report, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate five hundred and ninety-six thousand dollars, exclusive of the amounts herein and heretofore appropriated:

Provided further, That the Secretary of War may, in his discretion, and in case the total cost shall not exceed the limit fixed herein, modify the project by locating the channel north of Shooters Island.

The channel north of Shooters Island, as proposed in that project, and also in the act of 1905, in accordance with which this report is submitted, would pass through the flats at the lower end of Newark Bay between Bergen Point and Elizabethport, and connect the channels of Kill van Kull and the Arthur Kill, and would form an additional and separate branch of the continuous inland waterway mentioned, passing Shooters Island. Navigation is now confined to the channel south of Shooters Island, which is about 420 feet wide between the wharves of Staten and Shooters islands, and too narrow to accommodate the increasing commerce of this waterway, and the object of making a channel north of Shooters Island is mainly to relieve this congested part of the through waterway. But the channel here joins that of Newark Bay and the Passaic River, now under improvement by the United States, and it is desirable in forming the proposed north branch to cut off a large part of Bergen Point, in addition to cutting through the flats north of Shooters Island for a distance of about 1 mile.

There would be little or no saving in distance in the through-water route by forming a north branch around Shooters Island, but the distance between the Arthur Kill, Newark Bay, and the Passaic and Hackensack rivers would be reduced over half a mile, as vessels could pass directly up and down and avoid the present circuitous route around Shooters Island. The commerce of Newark Bay and its tributaries is very large, as will be seen by reference to statistics mentioned below. A part of the city of Elizabethport, lying to the north of the present course of the channel now under improvement, would be materially benefited by the proposed channel.

A study of the history of the improvement shows that the location of a channel north of Shooters Island has been contemplated in connection with every plan of improvement since its beginning. The question of forming this channel was thoroughly considered in connection with the layout of the present project, and in his reports of December 15, 1902, and March 27, 1903, on the location of this channel, the conclusion of Col. C. W. Raymond, Corps of Engineers (now brigadier-general, U. S. Army, retired), was that the main reason for locating the channel south of Shooters Island was because a survey made in connection with this subject at the time showed that it could not be located north of the island without increasing the cost of the improvement as provided for by the act.

The commerce in 1903 passing directly through Newark Bay and its tributaries to and from the Arthur Kill was estimated at 1,004,678 tons, valued at \$18,100,000. It consisted principally of tows and barges, tugboats, etc. The through traffic of the Arthur Kill was then given as 11,651,300 tons, valued at \$165,200,000. The papers from parties interested, transmitted with this report, do not give a total statement of the present commerce of this waterway, but it appears from statistics collected in connection with the Annual Reports of the Chief of Engineers, and other sources, that there has been an increase of 20 per cent in the tonnage and that the value of the commerce has doubled since 1901. The greater part of this commerce is general,

especially the coal, which passes from distributing points to all parts of the coasts of New Jersey, New York, and New England.

It appears from the reports of Colonel Raymond, dated March 27 and August 11, 1903, upon the question of setting back the harbor lines to admit of a greater width in the channel south of Shooters Island, and all accompanying papers, that there would be great objections to setting back the lines and that it would be impracticable to provide the extra width required by commerce in that manner.

A project for a channel north of Shooters Island should be made with a view of making it an extension to the present project, which should also include the project for the improvement now carried on under the head of "Channel between Staten Island and New Jersey, New York and New Jersey," around Corner Stake light, thus merging the two projects under one head; and it should also contemplate the entire removal of the middle ground marked by the Corner Stake light, of which a small portion would otherwise be left between the two channels. The new channel under project of 1902 is well advanced. The proposed channel north of Shooters Island is very necessary for the navigation of the adjoining waters.

In my opinion the formation of a channel 300 feet wide north of Shooters Island as a branch of the through waterway between New York Harbor and Raritan Bay is a work worthy to be undertaken by the United States. A survey will be required to ascertain the amount, character, and cost of the dredging to be done through the flats north of Shooters Island and in the removal of a part of Bergen Point. The cost of maintenance, unless a dike is built on the north side of the channel, would be about \$5,000 per year for four years, and after that time \$2,500 per year. A survey on which to base an estimate would cost about \$1,000. This work would be necessarily somewhat expensive, as it would require a number of borings to show the character of the material at Bergen Point and elsewhere.

Very respectfully, your obedient servant.

W. R. LIVERMORE,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., February 26, 1906.

Respectfully returned to the Chief of Engineers, United States Army.

The Board of Engineers for Rivers and Harbors has given careful consideration to the report of the district officer upon a preliminary examination of a channel from the Kill van Kull north of Shooters Island to the existing channel near to Corner Stake light, including the reef at Bergen Point light, with a view to obtaining a depth of 16 feet.

The proposed channel would be a branch of the inland waterway between Staten Island and New Jersey, extending from New York Harbor to Raritan Bay. The existing project for the improvement of this waterway, adopted by the river and harbor act approved June 13, 1902, provides for a channel from Kill van Kull to Raritan Bay 300

feet wide and 21 feet deep at mean low water, at an estimated cost of \$696,000, and \$5,000 for annual cost of maintenance. Work under this project is authorized to be done under continuing contract. This channel passes south of Shooters Island, where it has a width of 420 feet between wharves.

The channel proposed north of Shooters Island would pass through the flats at the lower end of Newark Bay, between Bergen Point and Elizabethport, and would form a second channel at this locality connecting Kill van Kull and Arthur Kill. It is primarily desired to relieve the congestion which exists in the channel south of the island, but it would also be of local benefit to the portion of Elizabethport north of the existing channel, and if in its construction the reef at Bergen Point light were removed, would increase the wharfage facilities at Bayonne. The channel would not materially shorten the water route from Raritan Bay to New York city, but would reduce about half a mile the distance between Arthur Kill and localities tributary to Newark Bay.

The commerce developing in Arthur Kill is very large and rapidly increasing. Over 10,000,000 tons of freight are annually carried through this channel and the tonnage of the vessels, empty and loaded, which make use of it is reported as over 20,000,000. In addition to this through commerce over 1,000,000 tons of freight are annually transported to and from Elizabethport.

The Board is of the opinion that the channel south of Shooters Island is inadequate for existing commerce and should either be enlarged or a second channel constructed north of the island.

Careful consideration was given to the question of the proper location of this channel when the project for the construction of the channel from Kill van Kull to Raritan Bay was submitted and its location south of Shooters Island was strenuously advocated by riparian land holders of northern Staten Island who at first appeared to consider the location of a channel 600 feet wide in this locality feasible, but the establishment of the channel has so increased the value of the abutting property that it now appears to be impracticable to obtain the desired enlargement by setting back the harbor lines, and an auxiliary channel north of Shooters Island is advocated to afford the desired relief. The Board therefore recommends that the district officer be authorized to make the necessary survey.

Whether all the work recommended should be executed at present is dependent upon its cost, and the Board recommends that in submitting estimates the district officer subdivide the work proposed so that the Board can determine the cost of the removal of the reef at Bergen Point, the excavation of the channel north of Shooters Island, and the enlargement proposed in the vicinity of Corner Stake light. The question of maintenance should receive careful consideration, as from the local conditions it would seem that the yearly deterioration of the new channel, especially that portion north of Shooters Island, would be large.

For the Board:

D. W. LOCKWOOD,
Lieut. Col., Corps of Engineers,
Senior Member of the Board.

[Third indorsement.]

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, February 28, 1906.

Respectfully submitted to the Secretary of War.

This is a report on preliminary examination authorized by the river and harbor act of March 3, 1905, of channel from the Kill van Kull north of Shooters Island to the existing channel near to Corner Stake light, including the reef at Bergen Point light, with a view to obtaining a depth of 16 feet.

Inviting attention to the report of the Board of Engineers for Rivers and Harbors in preceding indorsement, I recommend that a survey of the locality as proposed be authorized.

A. MACKENZIE,
Brig. Gen., Chief of Engineers, U. S. Army.

[Fourth indorsement.]

WAR DEPARTMENT,
March 2, 1906.

Approved as recommended by the Chief of Engineers in the preceding indorsement.

ROBERT SHAW OLIVER,
Assistant Secretary of War.

SURVEY OF CHANNEL IN NEWARK BAY, NEW JERSEY, FROM KILL VAN KULL NORTH OF SHOOTERS ISLAND.

UNITED STATES ENGINEER OFFICE,
New York, N. Y., December 6, 1906.

GENERAL: In compliance with instructions contained in letter of the Chief of Engineers, dated March 5, 1906, I have the honor to submit the following report upon a survey of a channel from the Kill van Kull north of Shooters Island to the existing channel near to Corner Stake light, including the reef at Bergen Point light, with a view to obtaining a depth of 16 feet, for which provision is made in section 9 of the river and harbor act approved March 3, 1905.

The hydrography and topography covered by this survey are exhibited on the accompanying map, and the estimates of quantity and cost of the improvement under consideration are contained in this report. The areas proposed to be dredged for the improvement of this waterway are shown on the map outlined by heavy broken lines. Locations of borings indicating character of bottom are shown by circles and numbers in blue. Borings are tabulated on map. The survey, map, and estimates were made under direction of Mr. H. B. Gorham, assistant engineer. The new Arthur Kill channel passing north of Staten Island and south of Shooters Island and Corner Stake light, to be made 300 feet wide and 21 feet deep at mean low water, is now about half completed south of Corner Stake light. This channel is shown on the map outlined in blue. The mean rise and fall of the tide is 5 feet.

The material to be removed in the areas outlined is mud, sand,

clay, and gravel. Rock removal would be required should it be decided to take off a larger portion of Bergen Point.

The report upon the preliminary examination, dated January 26, 1906, contains a description of this waterway. It appears from a study of navigation interests and from reports and letters received bearing on this matter that a practical channel in this locality should be about 300 feet wide and at least 16 feet in depth at mean low water.

A branch channel north of Shooters Island has been under consideration for many years, and its formation has been strongly recommended by navigation interests. This fact is more fully explained in the report upon the preliminary examination and in former reports bearing upon the subject.

It does not appear necessary to cut off a large portion of Bergen Point at the present time. The deflection will be slight in passing to and from Kill van Kull to the proposed channel, and it is thought that the tows will not now require a larger curve at that point.

Referring to the question of maintenance, to which particular attention has been invited in the report of the Board of Engineers for Rivers and Harbors, mentioned in Department letter of March 5, 1906, I have to say that it is believed that shoaling, which has always been considerable in the channel between Staten Island and New Jersey, would probably not be excessive in the proposed channel, as tidal currents would pass through it unless Shooters Island should be extended northward sufficiently to produce an eddy or area of slack water. The tidal currents of Newark Bay divide at Shooters Island and pass in either direction through Kill van Kull and the Arthur Kill.

In my opinion, the formation of a channel 300 feet wide and 16 feet deep at mean low water, including the removal of a part of Bergen Point and the entire removal, to 16 feet depth, of the middle ground formed by the separation of the old channel between Staten Island and New Jersey and the new Arthur Kill channel and marked on the northern extremity by Corner Stake light, is an improvement worthy to be carried out by the United States in accordance with the following estimates:

ESTIMATES.

For dredging a channel north of Shooters Island from Kill van Kull to the existing channel near to Corner Stake light 300 feet wide and 16 feet deep at mean low water with the widening of the approach to Newark Bay—740,000 cubic yards, at 25 cents.....	\$185,000
Dredging for the removal of a part of the reef at Bergen Point light, with depth of 16 feet at mean low water—23,000 cubic yards, at 30 cents	6,900
For dredging the middle ground in the locality of the Corner Stake light—175,000 cubic yards, at 30 cents	52,500
For dredging for the removal of the middle ground in the channel between Bergen Point and Shooters Island—41,000 cubic yards, at 25 cents	10,250
For engineering and contingencies, 10 per cent.....	25,465
Total.....	280,115

The estimates provide for scow measurement and side slopes of 1 on 3.

Maintenance is estimated at \$5,000 annually. Easy and free passage in and out of the proposed channel would require the removal

of a shoal lying between Bergen Point and Shooters Island and a small triangular area on the east approach. These areas are outlined on the map and included in the estimates.

Very respectfully, your obedient servant.

D. W. LOCKWOOD,
Colonel, Corps of Engineers.

Brig. Gen. A. MACKENZIE,
Chief of Engineers, U. S. A.

[Second Indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 12, 1906.

Respectfully returned to the Chief of Engineers, United States Army.

The Board of Engineers for Rivers and Harbors has had under consideration the within report of the district officer on a survey of a channel from the Kill van Kull north of Shooters Island to the existing channel near to Corner Stake light, including the reef at Bergen Point light with a view to obtaining a depth of 16 feet, made in extension of a preliminary examination for the purpose of formulating an estimate of cost of the work deemed necessary at this locality.

In its report reviewing that of the district officer on the preliminary examination above referred to, the Board discussed the commercial necessity for the proposed improvement and expressed the opinion "that the channel south of Shooters Island is inadequate for existing commerce and should either be enlarged or a second channel constructed north of the island." Further study developed the fact that sufficient widening of the south channel to meet the present and future necessities of navigation is impracticable on account of the great value of abutting property on Staten Island, precluding the possibility of a sufficient setting back of the harbor lines. The additional facilities required can therefore best be obtained to the north of Shooters Island, and the district officer submits a plan, at a total cost of \$280,115, covering the work required to provide a channel from Kill van Kull to the existing channel near Corner Stake light 300 feet wide and 16 feet deep at mean low water, together with the removal of part of the reef at Bergen Point and of the middle-grounds in the locality of Corner Stake and Bergen Point lights. The cost of maintenance is estimated at \$5,000 annually.

Having in mind the enormous commerce utilizing the water route through Kill van Kull and Arthur Kill, and the obvious present and future necessity for greater facilities than can be afforded by the narrow channel between Shooters Island and Staten Island, the Board concurs in the opinion of the district officer that it is advisable for the United States to undertake the further improvement of this locality, and it recommends the adoption of the project outlined within as an extension of the existing project for the improvement of Arthur Kill, or Staten Island Sound, from Kill van Kull to Raritan Bay.

For the Board:

R. L. HOXIE,
Lieut. Col., Corps of Engineers,
Senior Member Present.



"A channel from the Kill von Kull north of Shooters Island to the existing channel near to Corner Stake Light including the reef at Bergen Point Light."

Oct.-Nov., 1906.

H. B. GORHAM, ASSISTANT ENGINEER
G. E. HAMLIN, ASSISTANT IN CHARGE.
E. H. AUSTIN, " " "
ARTHUR L. MILLER, " " "
CARLOS L. AYRES, DRAFTSMAN

To accompany report of this date to the
Chief of Engineers.

SOUNDINGS.

Soundings are expressed in feet and tenths and refer to the plane of mean low water.

The 6 fathure is shown thus: -----

12	15	17	21	27	31
12	18	20	22	24	25
21	21	21	21	21	21

The mean range of tides is 50 feet.

BENCH MARK,
City Dock, Mariners Harbor, Staten Island, NY
Horizontal pair of five copper nails in first
fender pile, about ten feet from outer end,
west side of dock
Elevation above m.l.w. 760 ft.

Water	After Mud	Sand	Clay	Gravel	Hard Gravel	Rock	Total
1	18	83	16		34		141
2	14	84	23				121
3	13	85	19		27	16	145
4	10	84	25		30	27	174
5	12	81	27		40	11	173
6	15	81	27		40	41	164
7	14	81	24		35	23	161
8	13	84	24		34	20	161
9	14	84	32		37	11	178
10	21	93	0		59	10	183
11	20	90	23		68	23	194
12	19	94	39		67	11	210
13	24	104	60		81	22	231
14	24	104	59		81	22	230
15	24	104	59	24	10	30	214
16	21	119		23	14	53	214
17	19	113		23	10		210
18	20	113		24	13		210
19	20	113		24	13		210
20	53			49	51	X	153
21	36			52	03	X	93
22	37			52	03	X	100
23	38			54	11	X	142
24	50			53	32	X	135
25	56			56		X	112
26	53			14		X	107
27	54			14		X	108
28	55			14		X	123
29	55			14		X	123
30	55			14		X	123
31	55			14		X	123
32	55			14		X	123
33	55			14		X	123
34	55			14		X	123
35	55			14		X	123
36	55			14		X	123
37	55			14		X	123
38	55			14		X	123
39	55			14		X	123
40	55			14		X	123
41	55			14		X	123
42	55			14		X	123
43	55			14		X	123
44	55			14		X	123
45	55			14		X	123
46	55			14		X	123
47	55			14		X	123
48	55			14		X	123
49	55			14		X	123
50	55			14		X	123
51	55			14		X	123
52	55			14		X	123
53	55			14		X	123
54	55			14		X	123
55	55			14		X	123
56	55			14		X	123
57	55			14		X	123
58	55			14		X	123
59	55			14		X	123
60	55			14		X	123
61	55			14		X	123
62	55			14		X	123
63	55			14		X	123
64	55			14		X	123
65	55			14		X	123
66	55			14		X	123
67	55			14		X	123
68	55			14		X	123
69	55			14		X	123
70	55			14		X	123
71	55			14		X	123
72	55			14		X	123
73	55			14		X	123
74	55			14		X	123
75	55			14		X	123



